PATENT APPLICATION
Docket No: 14321.89

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of		)
	Takashi Saida et al.	)
Serial No.:	10/587,446	) Art Unit 2874
Filed:	July 25, 2006	)
Confirmation No.:	5371	)
For:	PLANAR LIGHTWAVE CIRCUIT, DESIGN METHOD FOR WAVE PROPAGATION CIRCUIT, AND COMPUTER PROGRAM	)

INFORMATION DISCLOSURE STATEMENT
UNDER 37 C.F.R. § 1.97

Commissioner for Patents
PO Box 1450
Alexandria, Virginia 22313-1450

Sir:

Please find, pursuant to 37 C.F.R. § 1.98(a)(1), the enclosed Form PTO-1449 which contains a list of all patents, publications, or other items that have come to the attention of one or more of the individuals designated in 37 C.F.R. § 1.56(c). While no representation is made that these references may be "prior art" within the meaning of that term under 35 U.S.C. §§ 102 or 103, the enclosed listed references are disclosed so as to fully comply with the duty of disclosure set forth in 37 C.F.R. § 1.56.

Moreover, while no representation is made that a specific search of office files or patent office records has been conducted or that no better art exists, the undersigned attorney of record believes that the enclosed art is the closest to the claimed invention (taken in its entirety) of which the undersigned is presently aware, and no art which is closer to the claimed invention (taken in its entirety) has been knowingly withheld.

In accordance with 37 C.F.R. §§ 1.97 and 1.98, a copy of each of the listed references or relevant portion thereof that is not a US patent document is also enclosed.

Statement of Relevance of References Listed
Unaccompanied by English Translation
Under 37 CFR § 1.98(a)(3)

In accordance with 37 CFR § 1.98(a)(3), the following concise explanation of the relevance of each listed reference that is not in the English language and unaccompanied by a translation into English is provided.

Japanese Publication No. 62-017708: PURPOSE: To execute a conversion of a multi-mode and a signal mode by non- adjustment, by providing the first waveguide having the same waveguide parameter as that of a multi-mode optical fiber, the second waveguide having the same waveguide parameter as that of a single mode optical fiber, and the third waveguide for converting the mode. CONSTITUTION: Refractive index distributions of an a-a section of a multi-mode optical fiber 1, a b-b section of the first waveguide 3, a c-c section and a d-d section of the third waveguide 5, an f-f section of the second waveguide, and a g-g section of a single mode optical fiber 2 are denoted as (a), (b), (c), (d), (f), and (g), respectively. First of all, light which has been propagated through the multi-mode optical fiber 1 is coupled by a small coupling loss to the first waveguide 3 having the same waveguide parameter as that of this fiber 1 and made incident on the third waveguide 5. Thereafter, a refractive index distribution and a waveguide diameter of the waveguide 5 are varied gradually, and in the end, become equal to a refractive index distribution and a waveguide diameter of the second waveguide 4 having the same waveguide parameter as that of the single mode optical fiber 2, therefore, the light is propagated to the second waveguide 4 by non-adjustment and without a coupling loss.

Japanese Publication No. 02-126205: PURPOSE: To reduce light scattering and to improve branch ratio setting accuracy by providing a mode conversion part between an input waveguide and a branch waveguide. CONSTITUTION: The mode conversion part 2 is provided between the input waveguide 1 and an output waveguide 3. The mode conversion part 2 has additional patterns 4-1 and 4-2 formed of a material having a refractive index nearly equal to that of the waveguide 1 on the waveguide, but the parts where the patterns are present increase in refractive index equivalently and light is converged. The mode pattern, therefore, becomes a right-left symmetrical bimodal type like a light intensity distribution (b). Further, the light intensity distribution (c) of the branch waveguide has a maximum point in the center of each waveguide and conforms with the bimodal type distribution (b), and light is distributed efficiently, thereby reducing the scattering loss. Further, the light intensity at a branch point decreases, so the accuracy of branch ratio setting is improved.

Japanese Publication No. 05-060929: PURPOSE: To reduce the optical coupling loss by making the width or/and the thickness of optical waveguides in the vicinity of an intersection smaller than those in the other parts. CONSTITUTION: The width of an intersection 14 is made narrower than width W0 of waveguides in the other parts, and parts on the intersection 14 side of optical waveguides 11, 12, and 13 connected to the intersection 14 are formed into taper parts 11a, 12a, and 13a where the width of waveguides is gradually reduced toward the intersection 14. Therefore, the gap D1 of the intersection 14 becomes fairly small. When this cross optical waveguide is actually produced, the width of each of taper parts 11a, 12a, and 13a of optical

waveguides 11, 12, and 13 is changed from W0, to W', and waveguide width W' and gap D' of an actual intersection 14A are shorter than the conventional waveguide width.

Japanese Publication No. 09-297228: PROBLEM TO BE SOLVED: To provide an array waveguide grating having a flat light frequency characteristic. SOLUTION: In the array waveguide grating provided with a channel waveguide 12 for an input arranged on a substrate 11, the channel waveguide 13 for an output, a channel waveguide array 14, a first sector slab waveguide 15 and a second sector slab waveguide 16, cores of respective waveguides of the channel waveguide 12 for the input in the vicinity of the boundary with the first sector slab waveguide 15 are made a parabolic shape. Thus, a light distribution having a flat electric field distribution in the boundary between the second sector slab waveguide 16 and the channel waveguide 13 for the output is formed, and the flat light frequency characteristic nearly fixing a dividing output characteristic even when a wavelength (light frequency) of a light source is changed is realized.

Japanese Publication No. 10-090537: PROBLEM TO BE SOLVED: To provide a small-sized optical multiplexer/demultiplexer circuit capable of converting a spot size of waveguide light with a low loss and constituting in a short device-length. SOLUTION: In a multi-mode interference waveguide (MMI1) provided with an input waveguide 2 of at least one part or more and an output waveguide 3 of at least one part or more, the widths of the input/output waveguides 2, 3 are changed in a tapered shape toward the light propagative direction. Further, the width of the MMI1 is changed in an input part, a middle part and an output part. Further, the ratio between the widths of the input/output waveguides 2, 3 is changed from the same of the waveguide widths of the input/output sides of the MMI1. Further, effective thicknesses or refractive indexes of a waveguide core layer 102 are changed.

Japanese Publication No. 11-133253: PROBLEM TO BE SOLVED: To attain an array waveguide type wavelength multiplexer/ demultiplexer capable of improving wavelength accuracy by suppressing a zigzag form and capable of reducing crosstalk to a low level. SOLUTION: The multiplexer/demultiplexer is constituted of one or plural input waveguides 2, a 1st slab waveguide 3, an array waveguide 4 constituted of plural waveguides having respectively different lengths, a 2nd slab waveguide 5, and plural output waveguides 6 which are formed on a substrate 1 and an waveguide having multi-mode electric field distribution is used for a connection part between both the slave waveguides 3, 5. In this case, mode stabilizing waveguides 8 are inserted between the input waveguide 2 and the 1st slave waveguide 3 and between the output waveguide 6 and the 2nd slab waveguide 5.

Japanese Publication No. 2002-90561: PROBLEM TO BE SOLVED: To provide an optical multiplexer/demultiplexer having structure by which a manufacture tolerance required for realizing the improvement of a transmission wavelength characteristics is relaxed. SOLUTION: A free propagation region (160) for improving the transmission wavelength characteristic is provided between an input waveguide (110) and a first slab waveguide (120). The free propagation region (160) is provided with a first part (161) whose width is increased from the input waveguide (110) toward the first slab waveguide (120) and a second part (162) which has the width larger than that of he input waveguide (110), the distribution of electric field intensity of light which advances from the input waveguide (110) to the first slab waveguide (120) is

widened once by the first part (161), but the widening is inversely limited by the second part (162). Thus, the change of the distribution of electric field intensity is less liable to the change of a waveguide width, and consequently required precision for fine working is relaxed.

NON-PRIOR ART DOCUMENTS

Attached for the Examiner's consideration is a copy of the International Search Report and Written Opinion for the present application with an English translation of Column V.2 of the Written Opinion.

Dated this 2nd day of April 2007.

Respectfully submitted,

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